WHAT IS CLAIMED IS:

1. A system for molding articles of low density polymer selected from polypropylene, polycarbonate, polystyrene, ABS, and polyethylene said system comprising:

a) a mold comprising a plurality of mold elements which are relatively movable between a closed position, for forming an enclosed cavity defining the shape of a said article, and an open position, for permitting removal of a said article formed in said enclosed cavity, at least one of said mold elements comprising a heating device for applying heating, during molding of said article, and a cooling device for applying cooling thereafter, to set said article, to at least one region of said enclosed cavity, said mold comprising an injection orifice permitting injection therethrough of a preselected quantity ("shot") of expandable polymer into said enclosed cavity;

b) an extruder operable to extrude said shot of expandable polymer into said enclosed cavity through said injection orifice, said shot comprising heated polymer and a blowing agent operable to cause expansion thereof;

c) a heat source operable to supply a heating fluid to said heating device; and

d) a cooling source operable to supply a cooling fluid to said cooling device.

2. A system for molding articles of low density polypropylene, said system comprising:

a) a mold comprising a plurality of mold elements which are relatively movable between a closed position, for forming an enclosed cavity defining the shape of a said article, and an open position, for permitting removal of a said article formed in said enclosed cavity, at least one of said mold elements comprising a heating device for applying heating, during molding of said article, and a cooling device for applying cooling

thereafter, to set said article, to at least one region of said enclosed cavity, said mold comprising an injection orifice permitting injection therethrough of a preselected quantity ("shot") of expandable polypropylene into said enclosed cavity;

b) an extruder operable to extrude said shot of expandable polypropylene into said enclosed cavity through said injection orifice, said shot comprising heated polypropylene and a blowing agent operable to cause expansion thereof;

c) a heat source operable to supply a heating fluid to said heating device; and

d) a cooling source operable to supply a cooling fluid to said cooling device.

3. A system as set forth in Claim 2, said at least one of said mold elements being thermally conductive, said heating device and said cooling device comprising a fluid passageway disposed within said at least one of said mold elements.

4. A system as set forth in Claim 3, said system further comprising a valve connected to said heat source, said cooling source, and said fluid passageway, said valve being operable to transmit heating fluid to said fluid passageway during molding of said article, said valve being operable to transmit cooling fluid to said fluid passageway during setting of said article.

5. A system as set forth in Claim 3, said fluid passageway being disposed at extremities and narrow regions of said enclosed cavity.

6. A system as set forth in Claim 4, said fluid passageway being disposed at extremities and narrow regions of said enclosed cavity.

7. A method for molding an article from expandable polymer in a mold, said expandable polymer comprising a polymer, selected from polypropylene, polystyrene, polycarbonate, ABS, and polyethylene, and a blowing agent, said mold comprising a plurality of mold elements each having a molding surface, said mold elements

being relatively movable between a closed position in which the molding surfaces together

define a molding cavity for forming the article, and an open position that permits removal

of said foam article, said method comprising the steps of:

a)i) heating said molding surfaces by conduction through said mold elements; and
a)ii) closing said mold elements to form said molding cavity;

b) after closing step (a)(ii), filling said molding cavity by injecting a preselected quantity ("shot") of said expandable polymer from an extruder;

c) heating at least extremities and narrow regions of said molding cavity to promote expansion and flow of said shot of expandable polymer throughout said molding cavity to form said article;

d) then cooling said molding surfaces to cause the expanded polymer to set in substantially the form of said molding cavity.

8. A method as set forth in Claim 7, wherein each said mold element is thermally conductive and has a fluid passageway therein, and wherein step (a)(i) is carried out by injecting a heating fluid steam into said fluid passageway.

9. A method as set forth in Claim 8, wherein said heating step (c) is switched to said cooling step (d) by switching a valve connected to a heat source, a cooling source, and said fluid passageway, said valve being operable to transmit heating fluid to said fluid passageway during molding of said article, said valve being operable to transmit cooling fluid to said fluid passageway during setting of said article.

10. An injection molded article formed by extrusion into an injection mold from expanded low density thermoplastic polymer selected from polypropylene, polystyrene, polycarbonate, ABS, and polyethylene, and a blowing agent, said article comprising extremities and narrow regions which are substantially free of thermal stress defects, incomplete formation of said extremities and narrow regions, and distortions.

11. An injection molded article as set forth in Claim 10, said expandable low density polymer being LDDP (low density polypropylene).